

GEOLOGICAL PHOTOGRAPHS.

GEOLOGISTS will welcome the second issue of photographs by the committee of the British Association, appointed for the collection, preservation, and systematic registration of photographs of geological interest. The circumstances which led to

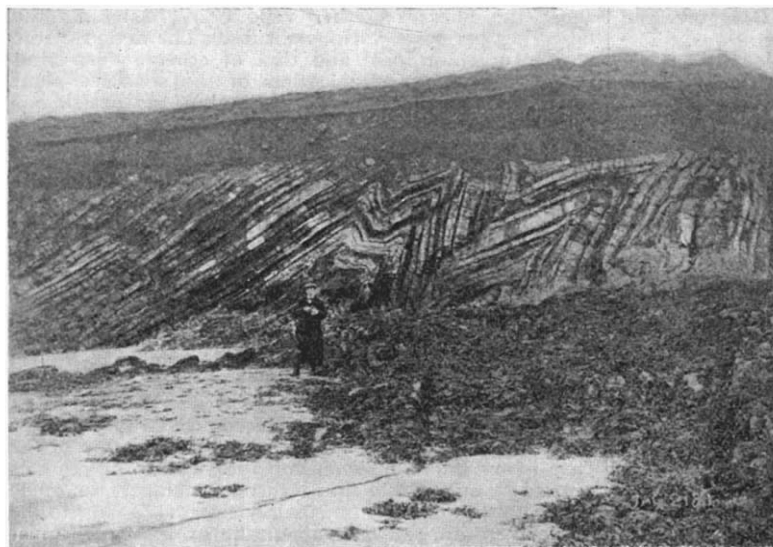


FIG. 1.—Overfolding in Upper Carboniferous Limestone: South of Lough Shinn, Dublin. Photographed by Mr. J. A. Cunningham.

the appointment of the committee were fully set forth in our review of the first issue (NATURE, vol. lxvii. p. 32, November, 1902). The value of these illustrations, both for teacher and student, is beyond question; indeed, as furnishing material for comparative study they may not infrequently prove useful to the investigator also; it may not perhaps be regarded in the light of a compliment when it is added that there is at least one university professor who makes them serve for examination purposes, but this is a perhaps too practical inquisitor, who, when weather permits, sets his examinees in front of previously unseen sections in the field. Every student, not to say teacher, of geology should have seen most of the phenomena somewhere or other which these photographs display, but it is very possible that not everyone has; it is even possible that some geologists have not seen a cirque, an esker, and a pitchstone-lava flow, *i.e.* not all three. Nothing, of course, can be a substitute for direct observation, but these photographs are certainly the next best thing to it.

Their value is greatly enhanced by the fact that the descriptions have in each case been entrusted to a specialist familiar with the structure illustrated; we need only refer to Profs. Bonney, Lapworth, Marr, Watts and Garwood, not to mention many other familiar names, to show that the scientific description

of scenery has been placed in the best of hands. The subjects chosen for illustration cover a wide range; the Scúr of Eigg, with its old lava flow filling a valley now exalted into a conspicuous hill, is shown from a point of view not often selected, and with excellent effect; the column of the Hemlock stone, very reminiscent of the Sahara, offers an admirable illustration of wind abrasion, though it is said to have been at one time mistaken for a sea-stack; a cirque in Bala rocks is interesting both in itself and on account of the associated glacial and fluvial phenomena; the Cheddar ravine is a good example of an unroofed subterranean stream; and a boulder of Silurian rock resting on a glacially polished pedestal of mountain limestone affords a proof of the comparatively trivial amount of subaerial denudation which has taken place since the close of the Glacial period; the cliffs of Muckross are an excellent study in jointing, here, as sharply shown as in a text-book diagram; the raised beach at Saunton Down End, near Barnstaple, is probably one of the finest examples of such beaches to be found in the British Isles; the classic unconformity of Old Red Sandstone on Silurian rocks at Siccar Point, referred to by many of the old masters and figured by Lyell in his "Elements," is well described by Prof. Lapworth; there is a good example of metamorphism produced by the great Whin sill; the rumbling hole in the ravine, Glenariff, co. Antrim, is a triumph of the photographer's skill.

From so much excellent material (the series com-



FIG. 2.—Stems of *Lepidodendron Veltheimianum*, Sternb., *n. situ*: Victoria Park, near Partick, Glasgow. Photographed by Mr. J. R. Stewart.

prises twenty-four photographs) it is difficult to choose, but with the kind permission of the photographers we select two examples for reproduction on a reduced scale, which may be taken as fair specimens of the

whole. The overfolded mountain limestone of Fig. 1, covered by Boulder-clay, presents many points of interest; the duplication of the fold, just behind the figure in the foreground, is particularly well shown, and the various behaviour of the beds in the anticlinal to the right is most instructive, as is the onion-shaped synclinal, which succeeds it. The second figure illustrates part of an ancient Carboniferous forest which extends over a considerable area around Glasgow, and is not seldom exposed by quarrying operations. The trunks of the trees are rooted in dark coloured carbonaceous shales, and covered with grey sandy shales and flaggy sandstones, in which their débris—branches and fragments of bark—lies scattered; overlying the whole is a sill of intrusive dolerite (unfortunately quarried away, and so not shown in the figure), to which possibly they owe their preservation. It is very gratifying to know that steps have been taken to protect this interesting exposure from the weather by roofing it over, though the scene must thereby lose some of the picturesqueness suggested by the photograph, where the contrast of the graceful living trees with the stumps of the extinct and monstrous Cryptogams (one of these measures 3 feet in diameter) has a very pleasing effect.

The committee is to be congratulated upon the great and general excellence of the work, and the editor of the series for the admirable judgment he has displayed in making a selection from the vast amount of material at his disposal.

ACTION OF ANÆSTHETICS ON PLANTS.

IT not unfrequently happens that the passer-by in autumn is startled to find horse-chestnuts and other spring-flowering trees producing a second crop of flowers. A similar occurrence is not infrequent in pear or apple trees and in the common laburnum. This autumnal flowering is due to one of two causes. In some cases after the flowers have been produced on the "old wood" or on short "spurs," the *Kurztriebe* of the Germans, formed in the previous autumn, other flowers are produced on the long shoots of the present year. The difference in the general appearance of a tree producing its flowers on the "spurs" and of one where the blossoms are produced on the "extension shoots" is often greater than that observable between distinct species, and yet, of course, there is no specific difference between them. The autumnal production of flowers on the yearling shoots is generally assigned, but in a vague, indeterminate fashion, to changes in external conditions. Be that as it may, there are some varieties such as the Napoleon pear which every year behave in this fashion. The operations of pruning are regulated by the way in which the buds are produced on the old or on the new wood of the year, so that the gardener has to take cognisance of appearances which might be, and indeed are, generally ignored by the systematic botanist.

Another cause of autumnal flowering is due to precocity or anticipation. This is the matter which in particular has suggested this note. The flower buds are formed in their usual place, but, for some reason or other, growth and development are hastened, and the flowers which in ordinary circumstances should unfold in the following spring are seen to expand in autumn.

In one of the squares in Paris last autumn the whole or the greater part of the horse-chestnut trees were in bloom, young foliage being interspersed among the flowers. On closer examination it was seen that the older leaves had almost all fallen prematurely or were shrivelled up as if the roots had been deprived in some

way of their necessary supplies of water. Similar instances of autumn flowering are familiar to observers, and they seem generally to be due to summer drought, to removal at an unpropitious period, or to any cause which interferes with the normal course of nutrition. Allusion is made to these phenomena because they throw light on the experiments of Johannsen, of Copenhagen, who was the first to show the effect of ether vapour in hastening the flowering period of various shrubs. The action of the vapour of chloroform and that of ether in arresting the movements of the leaflets of the sensitive plant (*mimosa*) have long been known, but the action has been considered to be purely local.

Matters were in this state when Johannsen pushed his experiments further, and in a different direction, and proved that the flowering of lilacs could be hastened by exposure to the vapour of ether. He thought that if he shortened the resting stage of the shrubs during which their activity is dormant, he would be enabled to induce the earlier and more rapid production of flowers. Exposure to the vapour of ether he found arrested the growth of the plant and secured its earlier and more complete "rest." Johannsen's experiments have been repeated on a large scale in Germany and in France, the general method of procedure being the following. In a case as nearly air-tight as possible, the lilac bushes are placed at a temperature of about 65° F. Light is excluded. From the top of the case is suspended a small cup into which the ether is poured by means of a funnel through an aperture, made for the purpose, and immediately closed. Owing to the explosive nature of the vapour the greatest care must be taken to avoid the presence of any flame. Thirty or forty grammes of ether are enough for a hundred cubic litres of air. The plants are subjected to the influence of the vapour for forty-eight hours. On their removal from the ether chamber the leaves fall, if they have not already done so. The plants are then removed to a cool house and gradually subjected to forcing in the ordinary manner.

By these means the expansion of the blooms is hastened, the etherised plants producing their blooms several days before those treated in the ordinary manner. The gain of a few days is a matter of great importance to the grower for market in the winter season, as he gets so much better a price for his goods. Moreover, the cost of fuel is reduced, for the same amount of heat is not required for forcing, as we have seen that the time required is diminished. Not only lilacs, but many other flowering shrubs have been experimented upon, and with such good results that the process has been adopted on a large scale, and in our own country Mr. Jannoch has, we learn, adopted the plan with most successful results.

A writer in the *Jardin* of January 20 narrates how he exposed plants of lilacs to the vapour of ether in the manner above described on December 7, removed them to the greenhouse on December 9, and on January 1 the flowers were sufficiently expanded for use in the decoration of his apartments. Other varieties followed at a few days' interval. *Spiraea Thunbergii* etherised on December 7 was in full bloom on December 24.

M. Minier, who made these experiments, placed his apparatus in a temperature of 13°–16° C., and the plants were subjected to the ether vapour for forty hours. They were afterwards placed in a house where the temperature ranged from 13°–16° C. at night to 15°–18° C. by day.

The photographs showing the contrast between the etherised and the non-etherised plants are very remarkable and bear witness to the value of the process in securing bloom in the dull season when the chrysanthemums are beginning to go off. It is noteworthy